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10/651,912	08/29/2003	Mung Suan Heng	108298735US	9571
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PERKINS COIE LLP PATENT-SEA P.O. BOX 1247 SEATTLE, WA 98111-1247			EXAMINER VIGUSHIN, JOHN B	
			ART UNIT	PAPER NUMBER
			2841	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/651,912

Applicant(s)

HENG ET AL

Examiner

John B. Vigushin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12, 15-18, 20-29, 31 and 34-37 is/are rejected.
- 7) ☒ Claim(s) 11, 13, 14, 19, 30, 32, 33 and 38 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0603/15 Jun 2005</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claims 34-38 are objected to because of the following informalities:

As to Claim 34, the Examiner notes that there is no antecedent basis provided for "the intermediate pads" in lines 13-14. However, comparing the claim to its product counterpart, Claim 15, the Examiner believes that the Applicant inadvertently omitted *and a plurality of intermediate bond pads positioned after* "pads" in line 4 of Claim 34. The Examiner will include the above-cited omitted phrase in the interpretation of Claim 34. Accordingly, the Examiner recommends amending Claim 34 by inserting --and a plurality of intermediate bond pads positioned-- after "pads" in line 4 of Claim 34, in order to provide the required antecedent basis for "the intermediate pads" recited in lines 13-14.

2. Claims 35-38 depend from Claim 34 and therefore inherit the defect of the claim.
3. Appropriate correction is required.

### **Rejections Based On Prior Art**

4. The following references were relied upon for the rejections hereinbelow:

Glenn et al. (US 6,522,015 B1)                      Koopmans (US 6,847,105 B2)<sup>†</sup>

<sup>†</sup>Already of record in Applicant's IDS of June 15, 2005 (Paper No. 0605).

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-10, 12, 20-27, 29 and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Glenn et al.

As to Claims 1 and 20, Glenn et al. discloses, in Figs. 6, 7 and 13 (col.16: 1-7): a first microfeature device 412 having a first bond pad surface 412F with a plurality of first bond pads 416 positioned at least proximate to the first bond pad surface 412F; a second microfeature device 452FC having a second bond pad surface 452F with a plurality of second bond pads 462 positioned at least proximate to the second bond pad surface 452F, the second bond pad surface 452F facing toward the first bond pad surface 412F; a package connection site 472-1A positioned to provide electrical communication between the first microfeature device 412 and devices external to the device package (Fig. 13; col.15: 23-34); a wirebond 474A coupled between at least one of the first bond pads 416 and the package connection site 472-1A (Fig. 13; col.16: 12-17); an electrically conductive link 612 coupled between the first microfeature device 412 and at least one of the second bond pads 462 of the second microfeature device 452FC (Fig. 13; col.9: 41-48; col.10: 18-29).

As to Claims 2 and 21, Glenn et al. further discloses the wirebond is one of a plurality of wirebonds 474, and wherein all the wirebonds of the package are connected directly to the first microfeature device 412 (Figs. 6 and 13).

As to Claims 3 and 22, Glenn et al. further discloses an encapsulant 1320 disposed adjacent to the first and second microfeature device packages (Fig. 13).

As to Claims 4 and 23, Glenn et al. further discloses the first microfeature device 412 includes an intermediate bond pad (i.e., the pad corresponding to trace 610A coupled (by trace 610A) to at least one first bond pad 416A (col.9: 57-col.10: 5), and wherein the electrically conductive link 612 is connected between the intermediate bond pad and the at least one second bond pad 462 of the second microfeature device 452FC (col.9: 41-48).

As to Claims 5 and 24, Glenn et al. further discloses the first microfeature device 412 includes an intermediate bond pad 610B electrically isolated from the at least one first bond pad 416 (Fig. 6; col.10: 18-26), and wherein the electrically conductive link 612 is connected between the intermediate bond pad 610B and the at least one second bond pad 462 of the second microfeature device 452FC (col.10: 26-29).

As to Claims 6 and 25, Glenn et al. further discloses the first and second microfeature devices 412 and 452FC have generally similar footprints (Figs. 6 and 13) and wherein an arrangement of the plurality of first bond pads 416 is at least generally similar to an arrangement of the plurality of second bond pads 462 (Figs. 6 and 13).

As to Claim 7, Glenn et al. further discloses the wirebond includes a first wirebond 474A, and wherein the package connection site includes a first package

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connection site 472-1A, and wherein the package further comprises: a second package connection site 472-1; and a second wirebond 660 connected between the electrically conductive link 612 and the second package connection site 472-1 (Figs. 6 and 13; col.10: 18-29; col.16: 13-18).

As to Claim 8, Glenn et al. further discloses the electrically conductive link 612 includes a volume of gold (col.9: 35-38).

As to Claim 26, Glenn et al. further discloses that coupling an electrically conductive link 612—between the first microfeature device 412 and the at least one of the second bond pads 462 of the second microfeature device 452FC, as recited in base Claim 20—includes coupling a wirebond 660 (col.10: 18-29).

As to Claim 27, Glenn et al. further discloses coupling an electrically conductive link includes coupling a volume of solder 612 (Fig. 13; col.9: 32-38).

As to Claims 9 and 28, Glenn et al. discloses, in Figs. 6, 7 and 13 (col.16: 1-7): a first microfeature device 412 having a first bond pad surface 412F with a plurality of first bond pads (i.e., the bond pad portions of 610 of first device 412 that are located beneath the second device 452FC and that receive the conductive link 612, as best seen in Fig. 13) positioned at least proximate to the first bond pad surface 412F; a second microfeature device 452FC having a second bond pad surface 452F with a plurality of second bond pads 462 positioned at least proximate to the second bond pad surface 452F, the second bond pad surface 452F facing toward the first bond pad surface 412F; a package connection site 472-1 positioned to provide electrical communication between the first microfeature device 412 and devices external to the

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device package (Fig. 13; col.15: 23-40); a wirebond 660 coupled between at least one of the first bond pads 610B and the package connection site 472-1 (Figs. 6 and 13; col.10: 18-29 and col.16: 12-17); an electrically conductive link 612 coupled between the at least one first bond pad (i.e. the pad portion of trace 610 that receives conductive link 612) of the first microfeature device 412 and at least one of second bond pad 462 of the second microfeature device 452FC (Fig. 13; col.9: 41-48; col.10: 18-29).

As to Claim 10, Glenn et al. further discloses the electrically conductive link 612 includes a volume of gold (col.9: 35-38).

As to Claims 12 and 31, Glenn et al. further discloses the first and second microfeature devices 412 and 452FC have generally similar footprints (Figs. 6 and 13) and wherein an arrangement of the plurality of first bond pads (i.e., the pad portions of traces 610 that receive conductive link 612) is at least generally similar to an arrangement of the plurality of second bond pads 462 (Figs. 6 and 13).

As to Claim 29, Glenn et al. further discloses coupling an electrically conductive link includes coupling a volume of solder 612 (Fig. 13; col.9: 32-38).

7. Claims 1-7, 9, 12, 15-18, 20-28, 31, 34-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Koopmans.

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

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the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

As to Claims 1 and 20, Koopmans discloses, in Figs. 2 and 3: a first microfeature device 20 having a first bond pad surface 22 with a plurality of first bond pads 32 and 38 positioned at least proximate to the first bond pad surface; a second microfeature device 40 having a second bond pad surface 46 with a plurality of second bond pads 42 positioned at least proximate to the second bond pad surface 46, the second bond pad surface 46 facing toward the first bond pad surface 22; a package connection site (not shown) positioned to provide electrical communication between the first microfeature device 20 and devices external to the device package (col.7: 25-30 and 44-47); a wirebond 28 coupled between at least one of the first bond pads 32 and 38 and the package connection site (col.5: 64-col.6: 1); and an electrically conductive link 44 coupled between the first microfeature device 20 and at least one of the second bond pads 42 of the second microfeature device 40 (col.7: 7-15).

As to Claims 2 and 21, Koopmans further discloses the wirebond 28 is one of a plurality of wirebonds 28, and wherein all the wirebonds 28 of the package are connected directly to the first microfeature device 20 (Figs. 2 and 3; col.7: 34-37).

As to Claims 3 and 22, Koopmans further discloses an encapsulant 70 disposed adjacent to the first and second microfeature device packages 20 and 40 (Fig. 2; col.7: 31-34).

As to Claims 4 and 23, Koopmans further discloses the first microfeature device 20 includes an intermediate bond pad 36 electrically coupled to the at least one first



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bond pad 38, and the electrically conductive link 44 is connected between the intermediate bond pad 36 and the at least one second bond pad 42 of the second microfeature device 40 (Fig. 2; col.7: 7-15).

As to Claims 5 and 24, Koopmans further discloses first microfeature device 20 includes an intermediate bond pad 36 electrically isolated from the at least one first bond pad 32 (Fig. 3; col.6: 4-12), and the electrically conductive link 44 is connected between the intermediate bond pad 36 and the at least one second bond pad 42 of the second microfeature device 40 (Fig. 2).

As to Claims 6 and 25, Koopmans further discloses the first and second microfeature devices 20 and 40 have generally similar footprints and wherein an arrangement of the plurality of first bond pads 32 and 38 is at least generally similar to an arrangement of the plurality of second bond pads 42 (Figs. 2 and 3; col.5: 57-61).

As to Claim 7, Koopmans further discloses the wirebond includes a first wirebond 28, and wherein the package connection site includes a first package connection site (that connects wirebond 28 from first bond pad 32; Figs. 2 and 3), and wherein the package further comprises: a second package connection site (that connects wirebond 28 from first bond pad 38; Fig. 3); and a second wirebond 28 connected between the electrically conductive link 44 and the second package connection site (by way of trace 37 and first bond pad 38; Fig. 3 and col.6: 7-21).

As to Claim 26, Koopmans further discloses coupling an electrically conductive link 44 includes coupling a wirebond 28 (the wirebond 28 connected to first bond pad 38 which is connected to link 44 by way of trace 37 and bond pad 36; Fig. 3).

As to Claim 27, Koopmans further discloses an electrically conductive link 44 includes coupling a volume of solder (col.7: 19-23).

As to Claims 9 and 28, Koopmans discloses, in Figs. 2 and 3: a first microfeature device 20 having a first bond pad surface 22 with a plurality of first bond pads 36 positioned at least proximate to the first bond pad surface; a second microfeature device 40 having a second bond pad surface 46 with a plurality of second bond pads 42 positioned at least proximate to the second bond pad surface 46, the second bond pad surface 46 facing toward the first bond pad surface 22; a package connection site (not shown) positioned to provide electrical communication between the first microfeature device 20 and components external to the device package (col.7: 25-30 and 44-47); a wirebond 28 coupled between at least one of the first bond pads 36 and the package connection site (by way of redistribution bond pads 38 which are connected to first bond pads 36; Figs. 2 and 3; col.5: 64-col.6: 1; col.6: 17-21); and an electrically conductive link 44 coupled between the at least one first bond pad 36 of the first microfeature device 20 and at least one of second bond pad 42 of the second microfeature device 40 (col.7: 7-15).

As to Claims 12 and 31, Koopmans further discloses the first and second microfeature devices 20 and 40 have generally similar footprints and wherein an arrangement of the plurality of first bond pads 36 is at least generally similar to an arrangement of the plurality of second bond pads 42 (col.5: 57-61; col.7: 7-15).

As to Claims 15 and 34, Koopmans discloses, in Figs. 2 and 3: a first microfeature device 20 having a first bond pad surface 22 with a plurality of first bond

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pads 32 and 38 and a plurality of intermediate bond pads 36 positioned proximate to the first bond pad surface; a second microfeature device 40 having a second bond pad surface 46 with a plurality of second bond pads 42 positioned at least proximate to the second bond pad surface 46, the second bond pad surface 46 facing toward the first bond pad surface 22; a first package connection site (not shown) positioned to provide electrical communication between the first microfeature device and components external to the device package (col.7: 25-30 and 44-47); a first wirebond 28 coupled between at least one of the first bond pads 32 and the first package connection site (col.5: 64-col.6: 1); a second package connection site (not shown) positioned to provide electrical communication between the second microfeature device and devices external to the device package (col.7: 25-30 and 44-47); a second wirebond 28 coupled between at least one of the intermediate bond pads 36 and the second package connection site (the coupling by way of trace 37 and first bond pad 38; Fig. 3 and col.5: 64-col.6: 1); and an electrically conductive link 44 coupled between the at least one intermediate bond pad 36 and at least one of the second bond pads 42 of the second microfeature device 40 (Fig. 2; col.7: 7-15).

As to Claims 16 and 35, Koopmans further discloses electrically conductive link 44 includes a volume of solder (col.7: 19-23).

As to Claims 17 and 36, Koopmans further discloses the second microfeature device 40 has a footprint that is larger than a footprint of the first microfeature device package 20 (col.5: 57-63).

As to Claims 18 and 37, Koopmans further discloses no wirebonds 28 of the package are connected directly to the second microfeature device 40 (Fig. 2; col.7: 34-37).

***Allowable Subject Matter***

8. Claims 11, 13, 14, 19, 30, 32, 33 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to Claim 11, patentability resides in *a volume of solder disposed between the intermediate bond pad and the at least one second bond pad*, in combination with the other limitations of the claim.

As to Claim 13, patentability resides in *the at least one second bond pad is electrically coupled to a second intermediate bond pad of the second microfeature device*, in combination with the other limitations of the claim.

As to Claim 14, patentability resides in *the first and second connection sites electrically decoupled from each other within the package*, in combination with the other limitations of the claim.

As to Claim 19, patentability resides in *the second microfeature device has a second intermediate bond pad electrically coupled to the at least one second bond pad*, in combination with the other limitations of the claim.

As to Claim 30, patentability resides in *coupling an electrically conductive link includes disposing a volume of solder between the at least one second bond pad and*

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*an intermediate bond pad electrically coupled to the at least one first bond pad*, in combination with the other limitations of the claim.

As to Claim 32, patentability resides in *the at least one second bond pad is electrically coupled to a second intermediate bond pad of the second microfeature device*, in combination with the other limitations of the claim.

As to Claim 33, patentability resides in *the first and second connection sites electrically decoupled from each other within the package*, in combination with the other limitations of the claim.

As to Claim 38, patentability resides in *the second microfeature device has a second intermediate bond pad electrically coupled to the at least one second bond pad*, in combination with the other limitations of the claim.

9. As allowable subject matter has been indicated, applicant's reply must either comply with all formal requirements or specifically traverse each requirement not complied with. See 37 CFR 1.111(b) and MPEP § 707.07(a).

### **Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

11. The following references disclose first and second stacked semiconductor devices wherein the bond wires that connect the stacked devices to the package substrate connection sites are only connected from the bottom semiconductor device:

Heo (US 6,555,917 B1): Fig. 1.

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Pu et al. (US 2002/0167079 A1): Fig. 2C.

Oka et al. (US 6,413,797 B2): Fig. 10.

Kobayashi et al. (US 6,420,787 B1): Figs. 7 and 8.

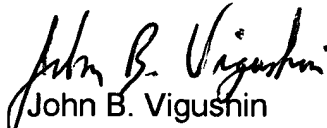
Chan et al. (US 2003/0089998 A1): Fig. 5.

Lin (US 2001/0000013 A1): Fig. 3.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B. Vigushin whose telephone number is 571-272-1936. The examiner can normally be reached on 8:30AM-5:00PM Mo-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
John B. Vigushin  
Primary Examiner  
Art Unit 2841

jbv  
September 18, 2005